

HARRIS CORPORATION - FARINON DIVISION
Comments on 2 GHz Unlicensed PCS

Interest: Microwave equipment manufacturer

Band plan:

- Agrees with FCC-proposed plan: 1850-1865/1930-1945 MHz, 1865-1880/1945-1960 MHz, and 1880-1895/1960-1975 MHz for licensed PCS, 1910-1930 for unlicensed PCS. (p. 2)
- Channelization is substantially consistent with existing channelization and pairing of the 1850-1990 MHz band. (p. 2)
- Plan for reallocation of frequencies nationwide for PCS may be excessive, since PCS will largely be urban. (p. 2)

Plan for relocation of existing users:

- Due to the potential for interference, unlicensed devices should be secondary to fixed microwave users. (p. 4)
- Because frequencies should only be reallocated in urban areas, rural microwave users should remain co-primary indefinitely. (p. 2)

Technical standards:

- TSB10E standards should be applied to unlicensed devices, with any TIA-approved revisions regarding long hops. (p. 3)
- TSB10E may need to be strengthened, however, because the channels to be assigned to PCS would overlay the channel assignments to existing users. (p. 3)
- TSB10E is not overly conservative, as some have suggested. (p. 3)
- The method for accumulating interference from mobiles is appropriate, as long as conservative estimates of the signal level from mobiles are used. (p. 4)

HEWLETT-PACKARD COMPANY
Comments on 2 GHz Unlicensed PCS Devices

Interest: Designs and manufactures computer and communications equipment

Band plan:

- 20 MHz of spectrum is not sufficient; a minimum of 40-65 MHz is required to accommodate wireless, LAN, wireless PBX, and cordless telephones. (p. 2)
- The frequencies allocated for unlicensed PCS devices must be adjacent to those allocated for licensed services. (p. 2)
- PCS spectrum should not be allocated for backhaul support. (p.2)

Plan for relocation of existing users:

- WINForum, as a formally constituted industry forum (see below), could arrange for bonds or other instruments that will be sold to finance the relocation of existing microwave users. (p. 3)

Technical standards:

- Co-equal sharing of spectrum by unlicensed USER-PCS and Part 94 operations is not feasible. (pp. 1-2)
- The Commission should constitute WINForum as a formal industry advisory committee, which should establish an etiquette for use of the frequencies. (p. 2) The Commission should adopt this etiquette, once established, as part of its rules. (p. 2)

Other:

- Generally supports the comments of WINForum; is commenting in order to emphasize certain points contained in the WINForum filing.

HITACHI TELECOM (USA), INC.
Comments on 2 GHz Unlicensed PCS Devices

Interest: Equipment manufacturer

Band plan:

- The 20 MHz proposed will be enough to encourage the design and development of unlicensed PCS, but the Commission must make provision for additional spectrum to meet expected demands (2-3).
- Suggests separate allocations for voice and data applications (3).

Channelization:

- Proposes one 10 MHz channel in the 1910-1920 MHz band and overlay of eight 1.25 MHz and thirty-three 300 kHz channels in the 1920-1930 MHz band (6).

Plan for relocation of existing users:

- Proposes that an industry group of interested parties work together to handle relocation negotiations (8).

Technical standards:

- Proposes that transmit power limitations of 100 mW peak for the 1.25 MHz channels also be applied to the 300 kHz channels (6).
- Supports proposed technical rules, but thinks frequency stability requirement should be less stringent (± 0.0003 percent) and spectrum monitoring techniques should be more specific (7).
- Maximum potential benefit for unlicensed applications requires that the band be cleared of incumbent users (8).

HUGHES NETWORK SYSTEMS, INC.
Comments on 2 GHz Unlicensed PCS Devices

Interest: Wireless communications provider

Band plan:

- Supports allocation of 20 MHz for unlicensed devices. However, the channelization plan may require adjustment over time, depending on which technologies prove most successful in the marketplace (6).

Cellular carrier participation:

- Opposes restrictions on cellular participation in PCS as these companies have extensive experience in and commitment to bringing mobile services to the public (7-8).

Regulatory status:

- The Commission should adopt policies requiring fair and non-discriminatory access to the PSTN (9).

Technical standards:

- The rules adopted should not restrict the scope of possible PCS applications (3-5).
- The Commission should leave the development of standards to industry bodies (9).

IEEE PROJECT 802
LOCAL AND METROPOLITAN AREA NETWORK STANDARDS COMMITTEE
Comments on 2 GHz Unlicensed PCS

Interest: Industry standards organization

Band plan:

- Between 70 and 140 MHz of spectrum in the Emerging Technologies Bands should be allocated for wireless LAN service to meet foreseeable demand. (4-6)
- This estimate does not include spectrum needed for wireless PBX services. (5)
- Urges allocation of as much spectrum as possible now and allocation of an extensive reserve band for future needs. (6)
- The 1910-1930 MHz band is particularly suitable for wireless LAN service, and will have interoperability benefits domestically and internationally. (7)

Plan for relocation of existing users:

- Endorses the Commission's plan in the Emerging Technologies proceeding, especially the "zero transition" timetable for unlicensed allocations. (7)
- The co-existence rules for unlicensed devices reflect undue regard for protecting the existing users, and it appears there is no means for co-primary sharing. (9)

Technical standards:

- Minimal technical regulations will promote diversity. (6)
- IEEE can facilitate development of coexistence and interoperability criteria. (8)
- The minimum spectral efficiency formula is premature and may be unwarranted. (9)
- Agrees with adaptive power control in general, but believes a threshold power level 10 dB below the maximum authorized power level should be selected below which adaptive power controls would not be needed. (10)
- IEEE is addressing wireless LANs at data rates from 1 to 20 megabits per second, which require large RF bandwidths not accommodated under the FCC's proposed channel plans. (10)

- The proposed frequency tolerances are unnecessary and unrealistic; devices should only be required to meet final out-of-band emissions specifications. (10)
- Out-of-band emissions should be referenced to maximum authorized power, not actual radiated power, to avoid penalizing manufacturers who limit in-band emissions. (10)
- Concur with the need for maximum power spectral density, but recommends a method for calculating spectral density that allows a suitable peak-to-average ratio. (11)
- The absolute power level are appropriate for the bandwidths given, but IEEE recommends that attention be paid to achieving a more uniform power spectral density among wireless LANs and applications employing a disparate range of bandwidths. (11)

0 0223

INTERDIGITAL COMMUNICATIONS CORPORATION
Comments on 2 GHz Unlicensed PCS

Interest: Manufacturer of wireless technology.

Channelization:

- FCC's channelization plan needlessly limits the development of the services that can be offered in the unlicensed band. (pp. 8-10).

Band plan:

- The allocation for unlicensed PCS devices should be increased to 40 MHz to ensure a high quality and variety of services. (pp. 10-11).

KNOWLEDGE IMPLEMENTATIONS, INC.
Comments on 2 GHz Unlicensed PCS

Interest: Engineering consultants.

Band plan:

- FCC should allocate 1910-1930 MHz and additional spectrum in the 1850-1865 MHz and 1930-1945 MHz bands for data transfer PCS devices. (pp. 3-4).

Channelization:

- FCC attempt to formalize the channelization of an unlicensed PCS band is premature; industry standards bodies must first make recommendations. (p. 4-6).

Licensing policies:

- The ability of small businesses to participate in PCS seems largely dependent on the degree to which useful unlicensed operation is permitted. (p. 5).

MATSUSHITA COMMUNICATIONS INDUSTRIAL CORPORATION OF AMERICA
Comments on 2 GHz Unlicensed PCS

Interest: Supplier of cellular mobile telephones and business telephone equipment; possible provider of wireless PBX systems.

Channelization:

- Supports proposed 10 MHz, 1.25 MHz and 100 kHz channelization scheme. (p. 5).
- Opposes the proposal for overlaying the different size channels because this would increase the potential for interference among various systems. (p. 6).
- The TIA Subcommittee on PCS should develop industry standards. (p. 6).

MCCAW CELLULAR COMMUNICATIONS, INC.
Comments on 2 GHz Unlicensed PCS Devices

Interest: Common carrier licensee for cellular service and potential new service provider

Band Plan:

- 1910-1930 MHz band; 20 MHz should be dedicated to unlicensed PCS services. Due to usage patterns of microwave licensees, band is relatively lightly used and is ideal for operation of unlicensed devices. (pp. 12-13).

Cellular carrier participation:

- Opposes any restriction on cellular carrier participation in new PCS services. Cellular carriers can contribute to success of PCS, promote competition, increase diversity of services provided, and improve efficiency. Asserts that constraints on cellular participation are discriminatory or would embroil Commission in endless eligibility questions. (pp. 22-33).

Local exchange carrier participation:

- Favors open entry policies but opposes set-asides for LECs as anticompetitive and discriminatory. (pp. 33-34).

Technical standards:

- Supports Commission's proposal to rely primarily upon the marketplace to develop PCS standards. (pp. 39-40).
- Believes that flexible service rules, not rigid or detailed technical standards, best serve the public interest. Any necessary technical standards should be as limited as possible and formulated by existing industry standards bodies. (pp. 40-42).
- Recommends that Commission establish RF protection standards consistent with its jurisdiction over customer handsets and authorization of their use. (p. 42).
- Requests Commission clarification of applicability of IEEE RF revision to operation of personal communications devices. (p. 42).

METROCALL OF DELAWARE, INC.
Comments on 2 GHz Unlicensed PCS

Interest: Provider of mobile services.

Channelization:

- Channelization should be left flexible so as not to foreclose options available to industry standards groups in defining technical standards. (p. 20).

Technical standards:

- Development of a spectral etiquette should be left to industry standards groups. (p. 20).

MOTOROLA, INC.
Comments on 2 GHz Unlicensed PCS Devices

Interest: Equipment manufacturer.

Band plan:

- Proposes an alternative PCS band plan for 1.8 GHz, composed of 5 blocks. (p. 9)

<u>BLOCK</u>	<u>SPECTRUM SEGMENT (MHz)</u>
A	1850-1870/1930-1950
B	1870-1890/1950-1970
C	1890-1900
D	1900-1910
E	1910-1930

- Blocks A and B should be paired segments, 40 MHz per operator, providing wide area, ubiquitous PCS public access services.
- Block C should be an unpaired 10 MHz segment shared by two licensees.
- Block D should also be an unpaired 10 MHz segment shared by multiple licensees or to expand the spectrum proposed for nonlicensed PCS.
- Block E should be an unpaired 20 MHz segment for nonlicensed PCS, as proposed by the FCC.

Plan for relocation of existing users:

- Unlicensed devices should be required to participate in a consortium as a condition to operating in the 1910-1930 MHz band. (p. 42)
- Suggests that a non-profit entity be established that would be open to membership by any company agreeing to participate on an equitable pro rata basis in funding a "compensation pool" for the relocation of 2 GHz microwave licensees operating in the spectrum allocated for PCS devices. (p. 42)

Technical standards:

- Believes the FCC should rely on industry standards but there must be an enforcement mechanism to ensure that new equipment meets industry formulated non-interference standards. (p. 26)

0 0229

- It is premature to endorse or oppose the Notice's specific channelization scheme. (p. 26)
- Submits a table proposing the minimum radiated power levels for nonlicensed systems. (p. 27)
- Believes the FCC's proposed frequency stabilities are too severe for price-sensitive services -- the FCC should require all radiated emissions to stay within the channelization ultimately adopted for nonlicensed PCS devices. (pp. 27-28)
- Emission limits should reference an absolute power level, and 50 dB below one Watt would be an appropriate specification. (p. 28)

NORTHERN TELECOM
Comments on 2 GHz Unlicensed PCS Devices

Interest: Worldwide supplier of digital telecommunication switching systems

Band plan:

- Recommends initial allocation of 35 MHz for unlicensed band, which would include 20 MHz currently proposed, along with 15 MHz in adjacent frequencies of 1895 MHz to 1910 MHz for additional unlicensed applications. Proposes "phased" implementation as spectrum is "cleared" of incumbent microwave licensees. (p. 22).

Cellular carrier participation:

- Supports allowing cellular carriers to offer PCS outside their service area. (p. 28).
- Believes that cellular carriers should be permitted to offer PCS-type services in their current spectrum in order to promote competition in service areas. (p. 29).

Local exchange carrier participation:

- States that local exchange companies should be able to compete on "level playing field." Regardless of whether they are allowed to obtain PCS license in their territory because of cellular operations, Commission must allow them the opportunity to provide wireless loop service either through a limited license for PCS spectrum or through a separate allocation for such services. (pp. 30-31).

Channelization:

- Supports Commission's channelization plan for the initial 20 MHz of spectrum for unlicensed PCS applications, with 10 MHz set aside for broadband, 5 MHz for medium band, and 5 MHz set aside for narrowband uses. (p. 23).

Plan for relocation of existing users:

- States that spectrum must be cleared of point-to-point microwave licensees because of significant potential interference problems. Suggests that Commission monitor and encourage industry developments to clear spectrum; proposes that point-to-point users in unlicensed PCS bands be given priority access to government spectrum or other 2 GHz spectrum if they cannot be accommodated in higher bands. (p. 18).

- Asserts that compensation should not exceed depreciated value, including engineering and installation costs, of the existing equipment. License application fees for new assignments should be waived, and level of compensation provided to relocated point-to-point licensees should be reduced by any remuneration received through such incentive mechanisms as tax certificates. Compensation for future commercial value of vacated spectrum should not be required. (p. 19).

Technical standards:

- Believes that Commission should encourage technical standards that permit same units to be used in both licensed and unlicensed applications. (p.34).
- States that equipment be fully type-approved to ensure compliance with unlicensed band restrictions, and to provide equitable spectrum use. (pp. 23-24). Strongly recommends that equipment for unlicensed PCS operations use same common air interface (CAI) used by PCS operators in licensed bands. (p. 24).

OMNIPOINT COMMUNICATIONS, INC.
Comments on 2 GHz Unlicensed PCS

Interest: New technology developer tentatively granted a pioneer's preference

Band plan:

- Initially, allocate 1850-1870/1930-1950 MHz and 1890-1900/1970-1980 MHz for licensee A, 1870-1890/1950-1970 MHz and 1900-1910/1980-1990 MHz for licensee B, and 1910-1930 MHz for unlicensed devices. (pp. 11-12)
- Recommends setting aside 1910-1930 MHz for unlicensed devices, but does not endorse allocating these frequencies until a satisfactory means of ensuring all existing users will be cleared is determined. (p. 15)

Plan for relocation of existing users:

- A comprehensive plan for relocating users must precede an allocation to unlicensed devices, since unlicensed devices require clear spectrum. (p. 15)

Technical standards:

- The spectral efficiency standards are heavily biased against the use of 10 MHz unlicensed equipment. (p. 15)
- Because 10 MHz equipment has the lowest power density, 10 MHz systems should be able to use either of the 10 MHz channels. (p. 15)

PACIFIC COMMUNICATION SCIENCES, INC.
Comments on 2 GHz Unlicensed PCS

Interest: Developer and producer of PCS-related technologies.

Band plan:

- 10 MHz of spectrum intended for narrower bandwidth operations (1920-1930 MHz) is not sufficient for wireless PBX using feasible voice coding technology; additional spectrum between 1930 and 1935 MHz should be made available. (p. 15).

Channelization:

- The separation of the 1920-1930 MHz band into different blocks for different bandwidth systems is inefficient; the entire band should be channelized into 100 kHz subchannels and the use of multiple subchannels should be permitted. (p. 16).
- Alternatively, the FCC should include the PHP and DECT channel sizes and power levels. (pp. 18-19).

Technical standards:

- The power density for the proposed 1910-1920 MHz band is too high and could be cut nearly in half. (p. 15).

PENNSYLVANIA PUBLIC UTILITY COMMISSION
Comments on 2 GHz Unlicensed PCS

Interest: State regulatory agency.

Plans for relocation of existing users:

- Existing microwave users should be compensated if they have to move from their designated band; the FCC should add a charge on unlicensed PCS devices to compensate incumbent users. (p. 10).

Technical standards:

- Interference with existing fixed microwave users must be minimized. (p. 10).

0 0235

PERTEL, INC.

Comments on 2 GHz Unlicensed PCS

Interest: Joint venture between Westinghouse Communications, Harron Communications, and the principals of Douglas Cable Communications, Inc., formed to pursue PCS

Band plan:

- Allocate 1910-1930 MHz for unlicensed devices, and 1850-1910 and 1930-1990 MHz for licensed systems. (p. 2)

Plan for relocation of existing users:

- No license should be issued for the 1910-1930 MHz band until all existing users are cleared from the spectrum band or standards for protecting existing users are mandated. (p. 17)

PUBLIC SAFETY MICROWAVE COMMITTEE
Comments on 2 GHz Unlicensed PCS Devices

Interest: Representative of state and local government agencies that use fixed microwave facilities for public safety communications

Technical standards:

- Points out that, while the 1910-1930 MHz band proposed for unlicensed devices may have fewer licensees than other frequencies targeted for PCS, it is heavily used in certain parts of the country.
- States that, in sufficient numbers, and at the wrong location, low power PCS operations could cause disruption to fixed microwave facilities and vice versa. (pp. 6-7). Coordination would be difficult as there would be no control over location of equipment or number of units in use. (p. 7).
- Asserts that Commission's suggestion that manufacturers and users negotiate relocation of existing microwave users is untenable, since unlicensed facilities will have no geographic boundaries, requiring the relocation of every single microwave facility in the 1910-1930 MHz band throughout the nation. (p. 7).
- Questions the feasibility of mechanism by which unlicensed equipment would be required to monitor automatically the spectrum before transmitting. (pp. 7-8).
- States that unlicensed operations in the 1910-1930 MHz band must also be required to protect any adjacent channel microwave facilities operating at 1905 MHz or 1935 MHz channels. (p. 8).
- Emphasizes need for additional measures to prevent interference to microwave facilities, including frequency coordination on regional or local basis between PCS providers and microwave licensees, establishment of local and regional planning committees, and requirement of automatic unit identification to be incorporated into both mobile and fixed PCS transmitters. (pp. 8-9).

ROLM
Comments on 2 GHz Unlicensed PCS

Interest: Manufacturer of private business exchanges.

Band plan:

- The 20 MHz proposed for unlicensed PCS operations is woefully inadequate. At a minimum, the FCC should allocate an additional 15 MHz from 1895 to 1910 MHz. (pp. 16-19).

Channelization:

- FCC should adopt "technology etiquette" for the sharing of unlicensed PCS spectrum that is being developed by the Wireless Information Networks Forum. (pp. 10-13).

Plan for relocation of existing users:

- Initially, only a limited number of microwave links will be affected by PCS devices because these devices will be introduced in metropolitan areas and will operate within buildings. (pp. 19-20).
- FCC and NTIA must agree to accomodate the most complex OFS transition requirements into the 1710 to 1850 MHz band. (p. 21).
- A PCS trade association should be formed to lead the OFS transition negotiations. This entity must be empowered by the FCC to collect a transition royalty and possibly to arbitrate frequency coordination disputes. (pp. 21-22).
- Initial funding of the transition costs should be collected either by "up front" charges to vendors who would receive credit towards a future royalty on type certified equipment, or by a bond to be paid down by the transition royalty for equipment authorization. (pp. 21-23).

ROSE COMMUNICATIONS, INC.
Comments on 2 GHz Unlicensed PCS Devices

Interest:

- Equipment manufacturer focusing on the unlicensed voice and low speed data market.

Band plan:

- Argues that the allocation for unlicensed PCS devices should be increased to 40 MHz, of which 30 MHz should be allocated specifically for voice systems. (p. 6)
- Proposes that the initial allocation for unlicensed PCS be made where a total of 80 MHz of contiguous spectrum would be available for future allocations should the market evolve as forecasted. (p. 6)

Channelization:

- Argues that asynchronous data services and isynchronous voice services cannot share the same spectrum and instead should be separated into two subbands. (p. 7,9)
- Supports the position that the data service sub-band not be specifically channelized but that the voice sub-band be divided into 1.25 MHz channels that are available on a shared, overlaid basis. Argues that no single voice transmitter should occupy more than one channel. (p. 10)
- States that 1.25 MHz channels will provide for TDMA and direct sequence spread spectrum approaches. (p. 11)
- States that data services should only be permitted in the voice sub-band as a secondary service. (p. 11)

Technical standards:

- States that the voice services require a listen-before-talk etiquette but that details of the etiquette and channelization are best left to the industry. (p. 11)
- Believes that the maximum permitted transmit power should be related to bandwidth. Supports using the formula: $\text{Power Limit} = 10^{-4} \text{ watts/square root of the bandwidth in Hz.}$ (p. 11)
- Believes that rapid deployment of unlicensed voice and low speed data PCS into the proposed spectrum can be accomplished with little disruption to existing microwave users. States that the PCS unlicensed devices

0 0239

could operate as secondary users under provisions similar to Part 15 of the FCC's Rules. (p. 14)

Other:

- States that the Commission should unbundle unlicensed PCS devices from the difficult and contentious issues relating to licensed PCS services. (p. 13)

0 0-40

CHANDOS A. RYPINSKI
Comments on 2 GHz Unlicensed PCS

Interest: Member of IEEE

Channelization:

- The entire 20 MHz allocation for unlicensed PCS devices should be assigned for wideband transmission. Narrow band service requires fixed partitioning that uses spectrum inefficiently. (pp. 2-10).

0 0241

THE SOUTH CAROLINA TELEPHONE ASSOCIATION
Comments on 2 GHz Unlicensed PCS Devices

Interest: Organization comprised of South Carolina's
28 local exchange carriers; potential PCS
providers.

Band plan:

- Advocates the provision of 20 MHz for unlicensed wide
band PCS applications, and another 20 MHz channel set
for unlicensed narrowband PCS applications. (p. 3).